

Abstract of the Disclosure

A method quantizes an input signal of N samples into a string of k symbols drawn from a q -ary alphabet. A complementary method reproduces a minimally distorted version of the input signal from the quantized string, given some distortion measure. First, an $[N, k]_q$ linear error-correcting code that has a sparse generator factor graph representation is selected. A fixed mapping from q -ary symbols to samples is selected. A soft-input decoder and an encoder for the SGFG codes is selected. A cost function is determined from the input signal and a distortion measure, using the fixed mapping. The decoder determines an information block corresponding to a code word of the SGFG code with a low cost for the input signal. The input signal can be reproduced using the encoder for the SGFG code, in combination with the fixed mapping.